BLACK BOX NETWORK SERVICES

Dynamic Fiber Conversion System
DFCS GigaTx - Giga Fiber User Manual

DFCS Giga Tx - Giga Fiber Dual Fiber Modules			
Fiber Type	Distance	Connector Type	
		SC	MT-RJ
MM	220 m	LMC3051C-R2	LMC3054C-R2
SM	12 km	LMC3052C-R2	LMC3055C-R2
SM	34 km	LMC3053C-R2	
DFCS Giga Tx - Giga Fiber Single-Fiber Modules			
Fiber / Connector Type	Distance	Tx: 1310 nm, Rx: 1550 nm	Tx: 1550 nm, Rx: 1310 nm
SM / SC	20 km	LMC3056C-R2	LMC3057C-R2

CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)

FREE technical support 24 hours a day, 7 days a week; Call **724-746-5500** or fax **724-746-0746**

Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018

Web site: **www.blackbox.com**

E-mail: **info@blackbox.com**

DESCRIPTION:

The Black Box *DFCS* GigaTx - Giga Fiber plug-in media converter provides 1000BASE-T UTP to 1000BASE-X fiber media conversion. The GigaTx - Giga Fiber supports Full/Half-duplex auto and forced negotiation with both hardware and software manual override controls.

The GigaTx - Giga Fiber can be used to connect Gigabit file servers to Gigabit switches and connect switches with Gigabit fiber uplinks.

The GigaTx - Giga Fiber plug-in module can be managed using Black Box's SNMP Management Software, 3rd Party SNMP Client, or with a Network Management Module (NMM) via Telnet or the Command Line Interface (CLI). Management requires *DFCS* SNMP Management Software and a Network Managment Module revision 3.4 or higher.

Link Modes:

In order to accommodate different user needs, the GigaTx - Giga Fiber converter supports five different linking modes.

In "Link Segment" (LS), a port transmits a "Link" signal independently of any received "Link" at any other port. For example, the UTP transmits a "Link" regardless of the fiber receiving a "Link" [Fig 1(a) and Fig 1(b)].

In "Link Propagate" (LP), a port transmits a "Link" signal only when receiving a "Link" at its other port. For example, the UTP transmits a "Link" only when receiving a "Link" at the fiber port. [Fig 1(c)].

In "Remote Fault Detection + Link Segment" (RFD+LS), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving "Link" signals both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped-back and can be reported to the network's core [Fig 1(d)].

In "Remote Fault Detection + Link Propagate" (RFD+LP), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving "Link" signals both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped-back and can be reported to the network core [Fig. 1(e)].

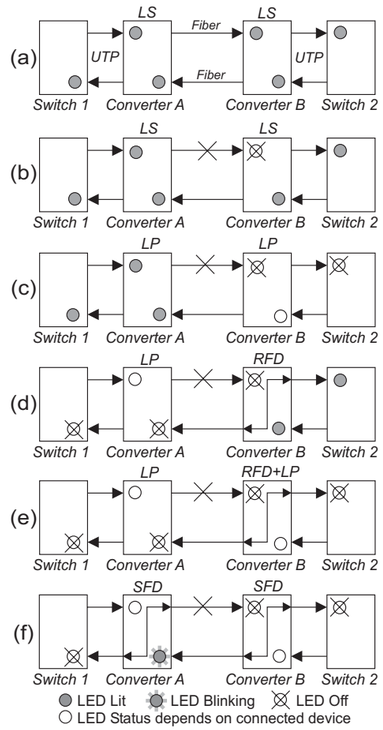

FIG. 1 Link Modes

NOTE: Connecting two converters with both set to either of the RFD modes is illegal and will cause a "deadly embrace" lockup.

In "Symmetrical Fault Detection" (SFD), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving a "Link" signal both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped back and can be reported to the network core. In addition, connecting two back-to-back converters which are both set to SFD facilitates dual-loop-back where fiber faults are reported to both ends of the network. A blinking fiber link LED indicates a fault of the transmit fiber or UTP cables of the converter whose LED is blinking [Fig. 1(f)].

NOTE: Converters in SFD mode must be deployed in pairs.

CONFIGURE DIP-SWITCHES:

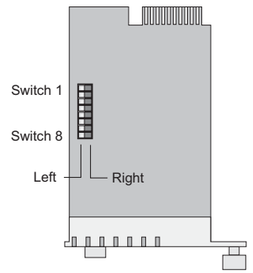

FIG. 2 DIP-Switch Locations

Switch	Left (Factory Default)	Right
SW1	**P1 AN:** Port 1 Fiber Auto-Negotiation	**P1 MAN:** Port 1 Fiber Manual Negotiation
SW2	**P2 AN:** Port 2 UTP Auto-Negotiation	**P2 MAN:** Port 2 UTP Manual
SW3	**FDX:** Port 2 UTP Full-Duplex	**HDX:** Port 2 UTP Half-Duplex
SW4	**OFF:** Port 2 Pause Advertisement Enable	**PAUSE:** Port 2 Pause Disable
SW5	**OFF:** Port 2 Asymmetric Pause Advertised	**ASYM:** Port 2 Asymmetric Pause Not Advertised
SW6 - SW8	**Link Mode Table**	

FIG. 3 DIP-Switches

SW1 - Port 1 Auto/Manual Negotiation "AN MAN"
When this DIP-switch is in the Auto-Negotiate "AN" position (factory default), the fiber optic port is transparent to the network and allows the end devices connected to the module to advertise through the module and establish negotiated settings between the end devices. If Port 2 (UTP) is not connected, the fiber port will not be able to establish a fiber link. In the AN mode, the DIP-switches for Pause, Port 2 (UTP) AN/MAN and link modes RFD and SFD are ignored.

If two GigaTX - Giga Fiber modules are linked together and Port 1 is configured for auto-negotiation, the mode of operation will be determined by the devices connected to Port 2 (UTP). Port 1 is transparent to the process.

When this DIP-switch is in the Manual "MAN" position, the advertised values of Port 2 is controlled by DIP-switches SW2 through SW5.

SW2 and SW3 - Port 2 (UTP) Settings "AN MAN" "FDX HDX"
These DIP-switches are only valid when Port 1 is set to "MAN". Port 2 is always set to auto-negotiation and DIP-switches SW2 and SW3 only define what modes are advertised. See Figure 4: Port 2 (UTP) Modes.

SW2	SW3	Port 2 (UTP) Modes of Operation
AN	FDX	Configured for Auto Negotiation. It advertises and negotiates in this order: **1000FDX, 1000HDX**
AN	HDX	Configured for Auto Negotiation. It advertises: **1000HDX**
MAN	FDX	Configured for Forced Negotiation. It advertises: **1000FDX**
MAN	HDX	Configured for Forced Negotiation. It advertises: **1000HDX**

FIG. 4 Port 2 (UTP) Modes

SW4 and SW5 - Port 2 Pause Advertisement "OFF PAUSE" "OFF ASYM"

These DIP-switches are only valid when Port 1 is set to "MAN". The PAUSE modes will be based on the configuration of DIP-switches SW4 and SW5.

SW4	SW5	Port 2 (UTP) PAUSE Modes
OFF	OFF	No Pause advertised
OFF	ASYM	Asymmetric PAUSE towards link partner
PAUSE	OFF	Symmetric PAUSE
PAUSE	ASYM	Both Symmetric PAUSE and Asymmetric PAUSE toward local device

FIG. 5 Pause Modes

SW6, SW7, SW8 - Link Modes

These three DIP-switches configure the link mode settings. DIP-switch SW6 is valid when Port 1 is set to "AN" or "MAN". DIP-switches SW7 and SW8 are ignored when Port 1 is set to "AN". The following table details possible Link Mode DIP-switch configurations.

SW1	SW6	SW7	SW8	Result
Left (AN)	Left	Left	Left	Enables Link Segment mode (LS).
Left (AN)	Right	Left	Left	Enables Link Propagate mode (LP).
Right (MAN)	Left	Left	Left	Enables Link Segment mode (LS).
Right (MAN)	Right	Left	Left	Enables Link Propagate mode (LP).
Right (MAN)	Left	Right	Left	Enables Remote Fault Detection mode plus Link Segment mode (RFD+LS).
Right (MAN)	Right	Right	Left	Enables Remote Fault Detection mode plus Link Propagation mode (RFD+LP).
Right (MAN)	Left	Left	Right	Enables Symmetrical Fault Detect mode (SFD).
Right (MAN)	Right	Left	Right	Illegal Setting, Link Segment (LS) is selected.
Right (MAN)	Left	Right	Right	Illegal Setting, Link Segment (LS) is selected.
Right (MAN)	Right	Right	Right	Illegal Setting, Link Segment (LS) is selected.

FIG. 6 Pause Modes

NOTE: Connecting two converters set to any of the RFD modes is illegal and will cause a "deadly embrace" lockup.

NOTE: It is recommended to keep the LS setting (default) until initial configuration is complete.

MOUNTING AND CABLE ATTACHMENT

DFCS modules are hot-swappable and can be installed into any chassis in the *DFCS* family.

a. Carefully slide the module into an open slot in the chassis. Align the module with the installation guides and ensure that the module is firmly seated against the backplane. Secure the module by fastening the front panel thumbscrew (push in and turn clockwise to tighten) to the chassis front. Verify the "Pwr" LED is ON (indicating the chassis is powered).

b. Connect the UTP port via a Category 5 cable or better to a 1000BASE-T Ethernet device.

c. Connect an appropriate multimode or single-mode fiber cable to the fiber port of the installed module. It is important to ensure that the transmit (Tx) is attached to the receive side of the device at the other end and the receive (Rx) is attached to the transmit side. Single-fiber (SF) media converter models operate in pairs. The Tx wavelength must match the Rx wavelength at the other end and the Rx wavelength must match the Tx wavelength at the other end.

VERIFYING OPERATION

Once the module has been installed and configured, verify the module is operational by viewing the status of the LED indicators. The table below provides a description for each LED indicator.

LED Function "Legend"	Color	Off State	On / Blinking State
Power "Pwr"	Green	No power	On: Module has power
1000Mbps Fiber Optics "P1"	Green	No Fiber Link	On: Fiber Link Fast Blinking: Fiber Data Activity Slow Blinking: Signal detect but auto-negotiation has not completed or SFD error detected
Port 2 (UTP) 1000Mbps "P2"	Green	Not linked	On: UTP linked at 1000Mbps Fast Blinking: UTP Data Activity Slow Blinking: SFD error detected
Port 2 (UTP) Full-Duplex "FDX"	Green	Half-Duplex when any UTP link is active	On: Full-Duplex when any UTP link is active

The Power LED indicates the module is receiving power from the chassis.

The Fiber Optic "FO" LED indicates the fiber optic connection between the modules has been established. A blinking LED indicates the presence of data, an auto-negotiation problem or a link mode error indication.

The UTP LEDs indicate the module has established a connection across its UTP port. A blinking LED indicates the presence of data.

SPECIFICATIONS	
Model	Giga Tx - Giga Fiber
Protocols	1000Base-X, 1000Base-T
Copper Connectors	RJ-45
Fiber Connectors	SC, MT-RJ, Single-Fiber SC
Controls	General: LS/LP, RFD, Pause Enable, Auto/Man, FD/HD
LED Displays	Pwr, FO link, UTP link, FD/HD
Dimensions	W: 0.85" x D: 4.5" x H: 2.8"
Weight	8 oz.
Compliance	UL, CE, FCC Class A, NEBS 3
Temperature -Operating -Storage	0 to 50 C -40 to 80 C
Altitude	0-10,000 ft
MTBF (hrs)	1,176,500

TRADEMARKS

All applied-for and registered trademarks are the property of their respective owners.

FEDERAL COMMUNICATIONS COMMISSION AND CANADIAN DEPARTMENT OF COMMUNICATIONS RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to be cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numéirques de las classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedelstales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra or superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u ostros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precación debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparto ha sido tirado o su cubierta ha sido dañada.

©Copyright 2003-2010. Black Box Corporation. All rights reserved.

1000 Park Drive · Lawrence, PA 15055-1018
724-746-5500 · Fax 724-746-0746

040-L3051-001C 9/09

BLACK BOX NETWORK SERVICES

Dynamic Fiber Conversion System
DFCS GigaTx - Giga Fiber User Manual

DFCS Giga Tx - Giga Fiber Dual Fiber Modules			
Fiber Type	Distance	Connector Type	
		SC	MT-RJ
MM	220 m	LMC3051C-R2	LMC3054C-R2
SM	12 km	LMC3052C-R2	LMC3055C-R2
SM	34 km	LMC3053C-R2	
DFCS Giga Tx - Giga Fiber Single-Fiber Modules			
Fiber / Connector Type	Distance	Tx: 1310 nm, Rx: 1550 nm	Tx: 1550 nm, Rx: 1310 nm
SM / SC	20 km	LMC3056C-R2	LMC3057C-R2

CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week; Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com**
E-mail: **info@blackbox.com**

DESCRIPTION:

The Black Box *DFCS* GigaTx - Giga Fiber plug-in media converter provides 1000BASE-T UTP to 1000BASE-X fiber media conversion. The GigaTx - Giga Fiber supports Full/Half-duplex auto and forced negotiation with both hardware and software manual override controls.

The GigaTx - Giga Fiber can be used to connect Gigabit file servers to Gigabit switches and connect switches with Gigabit fiber uplinks.

The GigaTx - Giga Fiber plug-in module can be managed using Black Box's SNMP Management Software, 3rd Party SNMP Client, or with a Network Management Module (NMM) via Telnet or the Command Line Interface (CLI). Managmenet requires *DFCS* SNMP Management Software and a Network Management Module revision 3.4 or higher.

Link Modes:

In order to accommodate different user needs, the GigaTx - Giga Fiber converter supports five different linking modes.

In "Link Segment" (LS), a port transmits a "Link" signal independently of any received "Link" at any other port. For example, the UTP transmits a "Link" regardless of the fiber receiving a "Link" [Fig 1(a) and Fig 1(b)].

In "Link Propagate" (LP), a port transmits a "Link" signal only when receiving a "Link" at its other port. For example, the UTP transmits a "Link" only when receiving a "Link" at the fiber port. [Fig 1(c)].

In "Remote Fault Detection + Link Segment" (RFD+LS), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving "Link" signals both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped-back and can be reported to the network's core [Fig 1(d)].

In "Remote Fault Detection + Link Propagate" (RFD+LP), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving "Link" signals both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped-back and can be reported to the network core [Fig. 1(e)].

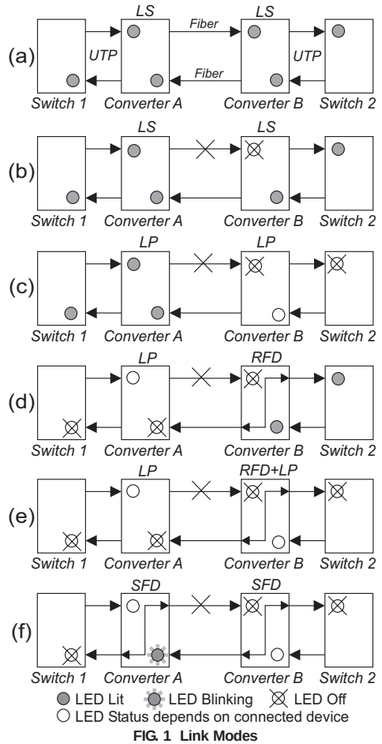

FIG. 1 Link Modes

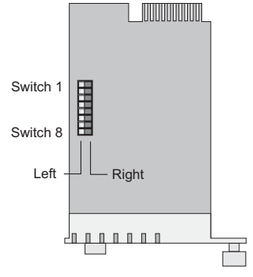

FIG. 2 DIP-Switch Locations

Switch	Left (Factory Default)	Right
SW1	**P1 AN:** Port 1 Fiber Auto-Negotiation	**P1 MAN:** Port 1 Fiber Manual Negotiation
SW2	**P2 AN:** Port 2 UTP Auto-Negotiation	**P2 MAN:** Port 2 UTP Manual
SW3	**FDX:** Port 2 UTP Full-Duplex	**HDX:** Port 2 UTP Half-Duplex
SW4	**OFF:** Port 2 Pause Advertisement Enable	**PAUSE:** Port 2 Pause Disable
SW5	**OFF:** Port 2 Asymmetric Pause Advertised	**ASYM:** Port 2 Asymmetric Pause Not Advertised
SW6 - SW8	**Link Mode Table**	

FIG. 3 DIP-Switches

SW1 - Port 1 Auto/Manual Negotiation "AN MAN"
When this DIP-switch is in the Auto-Negotiate "AN" position (factory default), the fiber optic port is transparent to the network and allows the end devices connected to the module to advertise through the module and establish negotiated settings between the end devices. If Port 2 (UTP) is not connected, the fiber port will not be able to establish a fiber link. In the AN mode, the DIP-switches for Pause, Port 2 (UTP) AN/MAN and link modes RFD and SFD are ignored.

If two GigaTX - Giga Fiber modules are linked together and Port 1 is configured for auto-negotiation, the mode of operation will be determined by the devices connected to Port 2 (UTP). Port 1 is transparent to the process.

When this DIP-switch is in the Manual "MAN" position, the advertised values of Port 2 is controlled by DIP-switches SW2 through SW5.

SW2 and SW3 - Port 2 (UTP) Settings "AN MAN" "FDX HDX"
These DIP-switches are only valid when Port 1 is set to "MAN". Port 2 is always set to auto-negotiation and DIP-switches SW2 and SW3 only define what modes are advertised. See Figure 4: Port 2 (UTP) Modes.

SW2	SW3	Port 2 (UTP) Modes of Operation
AN	FDX	Configured for Auto Negotiation. It advertises and negotiates in this order: **1000FDX, 1000HDX**
AN	HDX	Configured for Auto Negotiation. It advertises: **1000HDX**
MAN	FDX	Configured for Forced Negotiation. It advertises: **1000FDX**
MAN	HDX	Configured for Forced Negotiation. It advertises: **1000HDX**

FIG. 4 Port 2 (UTP) Modes

SW4 and SW5 - Port 2 Pause Advertisement "OFF PAUSE" "OFF ASYM"

These DIP-switches are only valid when Port 1 is set to "MAN". The PAUSE modes will be based on the configuration of DIP-switches SW4 and SW5.

SW4	SW5	Port 2 (UTP) PAUSE Modes
OFF	OFF	No Pause advertised
OFF	ASYM	Asymmetric PAUSE towards link partner
PAUSE	OFF	Symmetric PAUSE
PAUSE	ASYM	Both Symmetric PAUSE and Asymmetric PAUSE toward local device

FIG. 5 Pause Modes

SW6, SW7, SW8 - Link Modes

These three DIP-switches configure the link mode settings. DIP-switch SW6 is valid when Port 1 is set to "AN" or "MAN". DIP-switches SW7 and SW8 are ignored when Port 1 is set to "AN". The following table details possible Link Mode DIP-switch configurations.

SW1	SW6	SW7	SW8	Result
Left (AN)	Left	Left	Left	Enables Link Segment mode (LS).
Left (AN)	Right	Left	Left	Enables Link Propagate mode (LP).
Right (MAN)	Left	Left	Left	Enables Link Segment mode (LS).
Right (MAN)	Right	Left	Left	Enables Link Propagate mode (LP).
Right (MAN)	Left	Right	Left	Enables Remote Fault Detection mode plus Link Segment mode (RFD+LS).
Right (MAN)	Right	Right	Left	Enables Remote Fault Detection mode plus Link Propagation mode (RFD+LP).
Right (MAN)	Left	Left	Right	Enables Symmetrical Fault Detect mode (SFD).
Right (MAN)	Right	Left	Right	Illegal Setting, Link Segment (LS) is selected.
Right (MAN)	Left	Right	Right	Illegal Setting, Link Segment (LS) is selected.
Right (MAN)	Right	Right	Right	Illegal Setting, Link Segment (LS) is selected.

FIG. 6 Pause Modes

NOTE: Connecting two converters set to any of the RFD modes is illegal and will cause a "deadly embrace" lockup.

NOTE: It is recommended to keep the LS setting (default) until initial configuration is complete.

MOUNTING AND CABLE ATTACHMENT

DFCS modules are hot-swappable and can be installed into any chassis in the *DFCS* family.

a. Carefully slide the module into an open slot in the chassis. Align the module with the installation guides and ensure that the module is firmly seated against the backplane. Secure the module by fastening the front panel thumbscrew (push in and turn clockwise to tighten) to the chassis front. Verify the "Pwr" LED is ON (indicating the chassis is powered).

b. Connect the UTP port via a Category 5 cable or better to a 1000BASE-T Ethernet device.

c. Connect an appropriate multimode or single-mode fiber cable to the fiber port of the installed module. It is important to ensure that the transmit (Tx) is attached to the receive side of the device at the other end and the receive (Rx) is attached to the transmit side. Single-fiber (SF) media converter models operate in pairs. The Tx wavelength must match the Rx wavelength at the other end and the Rx wavelength must match the Tx wavelength at the other end.

VERIFYING OPERATION

Once the module has been installed and configured, verify the module is operational by viewing the status of the LED indicators. The table below provides a description for each LED indicator.

LED Function "Legend"	Color	Off State	On / Blinking State
Power "Pwr"	Green	No power	On: Module has power
1000Mbps Fiber Optics "P1"	Green	No Fiber Link	On: Fiber Link Fast Blinking: Fiber Data Activity Slow Blinking: Signal detect but auto-negotiation has not completed or SFD error detected
Port 2 (UTP) 1000Mbps "P2"	Green	Not linked	On: UTP linked at 1000Mbps Fast Blinking: UTP Data Activity Slow Blinking: SFD error detected
Port 2 (UTP) Full-Duplex "FDX"	Green	Half-Duplex when any UTP link is active	On: Full-Duplex when any UTP link is active

The Power LED indicates the module is receiving power from the chassis.

The Fiber Optic "FO" LED indicates the fiber optic connection between the modules has been established. A blinking LED indicates the presence of data, an auto-negotiation problem or a link mode error indication.

The UTP LEDs indicate the module has established a connection across its UTP port. A blinking LED indicates the presence of data.

SPECIFICATIONS	
Model	Giga Tx - Giga Fiber
Protocols	1000Base-X, 1000Base-T
Copper Connectors	RJ-45
Fiber Connectors	SC, MT-RJ, Single-Fiber SC
Controls	General: LS/LP, RFD, Pause Enable, Auto/Man, FD/HD
LED Displays	Pwr, FO link, UTP link, FD/HD
Dimensions	W: 0.85" x D: 4.5" x H: 2.8"
Weight	8 oz.
Compliance	UL, CE, FCC Class A, NEBS 3
Temperature -Operating -Storage	0 to 50 C -40 to 80 C
Altitude	0-10,000 ft
MTBF (hrs)	1,176,500

CONFIGURE DIP-SWITCHES:

NOTE: Converters in SFD mode must be deployed in pairs.

In "Symmetrical Fault Detection" (SFD), the UTP port transmits a "Link" signal only when receiving a "Link" at the fiber port. The fiber port transmits a "Link" only when receiving a "Link" signal both at the fiber port and the UTP port. As a result, fiber faults (no "Link" received at the fiber) are looped back and can be reported to the network core. In addition, connecting two back-to-back converters which are both set to SFD facilitates dual-loop-back where fiber faults are reported to both ends of the network. A blinking fiber link LED indicates a fault of the transmit fiber or UTP cables of the converter whose LED is blinking [Fig. 1(f)].

TRADEMARKS

All applied-for and registered trademarks are the property of their respective owners.

FEDERAL COMMUNICATIONS COMMISSION AND CANADIAN DEPARTMENT OF COMMUNICATIONS RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to be cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numéirques de las classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

NORMAS OFICIALES MEXICANAS (NOM)

ELECTRICAL SAFETY STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedelstales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra or superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u ostros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precación debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparto ha sido tirado o su cubierta ha sido dañada.

©Copyright 2003-2010. Black Box Corporation. All rights reserved.

1000 Park Drive · Lawrence, PA 15055-1018
724-746-5500 · Fax 724-746-0746

040-L3051-001C 9/09